biological transmission. Unfortunately, some writers have interpreted biological to mean cyclical, that is, that the parasite concerned undergoes morphological change in the transmitting arthropod. It seems obvious, however, that at least two biological events may occur in the life of a parasite during its sojourn in the invertebrate host. It may multiply, or it may undergo cyclical change. Other changes are conceivable, but as yet not demonstrated. The four combinations which may be made of these two biological events are given below, together with the names being

	Multiplication of organism in vector	No multiplication of organism in vector
Cyclical change of organism in vector	I. Cyclo-propagative Example: Malaria by mosquitoes	II. Cyclo-developmental Example: Filaria by mosquitoes
No cyclical change of organism in vector	III. Propagative Typhus by lice	IV. Mechanical Typhoid by flies

proposed for the type of transmission represented by the combination.

It will be noted that the older term, biological, can still be retained as a collective term for types I, II and III in contrast to type IV, for which I have retained the old term, mechanical. The classification proposed is, then:

Diseases Classified According to Type of Transmission

A. Biological
- I. Cyclo-propagative—the organisms undergo cyclical change and multiply.
- II. Cyclo-developmental—the organisms undergo cyclical change but do not multiply.
- III. Propagative—the organisms undergo no cyclical change, but they multiply.

B. IV. Mechanical—the organisms undergo neither cyclical change nor multiplication.

It is, of course, difficult to classify all arthropod-borne diseases on such a scheme. The transmission of relapsing fever by ticks is very probably propagative, but since it is believed by some authors that the spirochaete undergoes a change in morphology in the tick, it is possible that this transmission may be cyclo-propagative. Also, some diseases may fall into two (or possibly more) classifications. The transmission of bubonic plague may be propagative, since we know that the causative organism can multiply in the fore-gut of the flea, and also possibly mechanical, by the direct passage of the organisms in the feces of a flea recently fed on an infected rat. However, it is believed that these cases do not lessen the value of the classification.

When the diseases of man are tabulated according to this scheme, certain facts stand out prominently which were previously obscure or unobserved. For example, it is found that a relatively small group of diseases is transmitted mechanically by arthropods. Also, when one looks for those diseases of greatest importance he finds them in groups I and III. The one characteristic, then, which they have in common is their ability to multiply within their arthropod hosts. The possible exception to this statement is the case of filariasis. However, the difficulty which this disease has in spreading is well known, and must certainly be attributed largely to the fact that the filarial organism does not multiply in its vector. The fact that the most important arthropod-borne diseases of man have one thing in common suggests that more emphasis should be placed upon investigating this common characteristic; that is, toward discovering what factors are concerned in determining whether a parasite can or can not multiply in its invertebrate host.

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GLAUCONITE AND FORAMINIFERAL SHELLS

IN the issue of SCIENCE for July 3d, A. L. Dryden, Jr., makes some statements relative to the occurrence of glauconite in fossil foraminiferal shells. The writer has been studying the mechanics of concretion development in fossil-bearing concretions from the Cook Mountain (Eocene) formation of Brazos County, Texas. This formation carries large amounts of glauconite, but the observations recorded below were made wholly on the glauconite found within the concretions. The figures are from counts made on

TABLE I

Type of occurrence	Number
Irregular, free, unpolished glauconite grains	126
Thoroughly rounded and polished, free glauconite grains	1911
Empty foraminiferal shells	21
Foraminiferal shells packed with glauconite	189
Foraminiferal shells packed with a mixture of glauconite and other mineral matter	57

TABLE II

Ratio of total free glauconite grains to total grains occupying foraminiferal shells	8.28 to 1
Ratio of foraminiferal shells packed with glauconite to shells packed with a mixture of glauconite and other mineral matter	3.33 to 1
Ratio of total packed foraminiferal shells to empty shells	11.10 to 1

petrographic thin sections cut from parts of 14 concretions. The grains recorded as "polished" are either circular or elliptical in section. If they were originally formed in the interiors of the foraminiferal shells the shells had been entirely removed and the grains rounded prior to their inclusion within the concretions.

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PEAT UNDER A DELAWARE BEACH

The article by Dr. Richards on the occurrence of sod under the New Jersey beaches, which appeared in Science for June 19, interested me very much. Similar material was found in 1911 on the beach at Rehoboth, Del. This was reported and figured in an article published in 1913.[1]

The material, a mass of peat several feet long, was exposed twice during the summer, after severe storms. It was embedded in the sand and appeared to continue landward as it disappeared under the sloping beach. A piece approximately a foot and a half in diameter was broken from the mass and is now in the Museum of the Department of Botany, Wellesley College. Other deposits, one described by a fisherman as "turf with stumps in it," were reported to have been exposed during winter storms.

The occurrence of peat in this situation was interpreted at that time as the remains of a marsh flora, developed from a lagoon formed by an old fringing bar. As the bar was pushed inland the sand overwhelmed the marsh and continued retreat of the shore line again exposed the buried vegetation.

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SPECIAL CORRESPONDENCE

A FLORA OF MEXICO

Our knowledge of the flora of Mexico is scattered through a multitude of systematic papers and a relatively small number of local floras, with only very few general works. The fundamental work for the study of the flora as a whole, Hemsley's four volumes of "Botany" (1879–88) in Salvin and Godman's great "Biologia Centrali-Americana," enumerates 12,233 species of vascular plants growing in the region from Mexico to Panama, with the citation of synonyms and specimens examined (the latter almost confined to the material in the Kew Herbarium). There are no keys, no vernacular names and no account of uses, and the botanist who does not have access to a large botanical library can derive little profit from it. Paul C. Standley's "Trees and Shrubs of Mexico" (1920–26) covers the woody plants very satisfactorily, giving keys, brief descriptions, synonymy and range, but its greatest value, perhaps, lies in the condensed accounts of uses and lists of vernacular names which the author has brought together under each species. The approximately 5,700 species included in this work represents perhaps half the known flora. The floras of several of the islands on the west coast have been published by Sereno Watson, E. L. Greene, J. N. Rose (partly in collaboration with George Vasey), Alice Eastwood and Mrs. R. S. Ferris. L. A. M. Riley's "Contribution to the flora of Sinaloa" (1923–24) was left incomplete at the death of the author and covers only the Polypetalae. A flora of the same state, the descriptive part of which, containing various new species, is unfortunately printed on unnumbered pages so as to be almost impossible to cite, is in process of publication by J. G. Ortega in the "Boletín de Procultura Regional" of the Sociedad Cooperativa Limitada of Mazatlán. Millspaugh's "Plantae Yucatanae," mostly written in collaboration with Mrs. Agnes Chase, was suspended nearly thirty years ago, after only five families had been covered. This gap has been filled by Standley's "Flora of Yucatan" (1930), the only complete flora of any Mexican state. The very interesting flora of the peninsula of Lower California, an area not included in Hemsley's "Botany," has been pretty thoroughly covered by T. S. Brandegee, especially as to the "Cape Region," and additional lists of value have been published by E. A. Goldman and I. M. Johnston.

The participation of United States botanists in the investigation of the flora below the present northern boundary of Mexico practically began with Asa Gray's papers on Charles Wright's second Texan and New Mexican collection (1853) and on Thurber's New Mexican and Sonoran collections (1854), and Torrey's "Botany of the [Mexican] Boundary" (1859), in which Gray collaborated. Into these works occasional species collected within the present limits of Mexico were introduced. Gray's papers on Xantus' plants from Lower California and L. C. Ervendberg's from Wartenberg, near Tantoyuca (both in 1861), were the first papers devoted entirely to Mexican plants published in this country. After a gap of fifteen years, Sereno Watson's two papers (1876) on

[1] Laetitia M. Snow, "Progressive and retrogressive changes in the plant associations of the Delaware coast," *Bot. Gaz.*, 55 (1): 45–55, fig. 6, 1913.